In the Oldest Old, Audiological Research is New

By Dennis A. Colucci, AuD, MA

For the oldest old, often defined as people age 85 and over, life has changed to such a degree that they have seen the departure of the Ford Model T and the switchboard operator, the arrival of the electric car and a Dick Tracy-style smartwatch, and the promise of tourist trips to outer space.

As the future continues to unfold, advanced age will be experienced by many more of our seniors, with hearing loss and central presbycusis hampering their health and quality of life.

In the United States, the 65-and-older population will double by 2030 to reach 72 million, according to the **National Institute on Aging**. Within this population, there are currently 53,000 people age 100 or older (**2010 Census**), but it is estimated that this number of centenarians will quadruple to 212,000 by 2030.

The projected increases in the oldest-old population are the result of a variety of forces affecting longevity, not just the aging population.

Given the 30-percent prevalence of hearing loss for 65 to 75 year olds (**National Institute on Deafness and Other Communication Disorders**) and 80-percent prevalence for 85 year olds (**National Center for Health Statistics**), the majority of seniors will require hearing rehabilitation.

Specifically, they will need early intervention, starting with the baby-boomer population, to achieve the long-term benefits associated with auditory stimulation and engagement.

In a remarkable article entitled "How Well Can Centenarians Hear," Zhongping Mao and associates describe the audiological findings from 21 males and 47 females age 100 and older living in Shaoxing, China (*PLoS One* 2013;8[6]:e65565). The study is the only one of its kind.

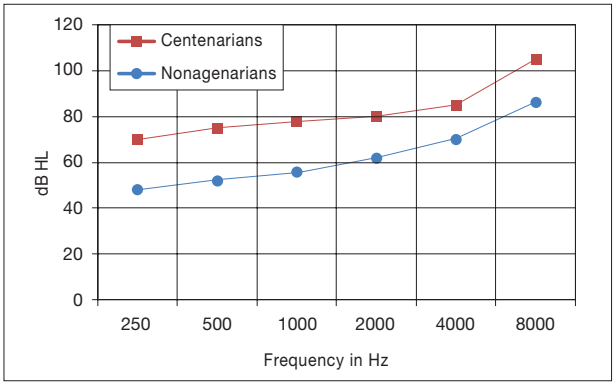
The 68 participants were between 100 and 106 years old, with a mean age of 102. They were screened for active middle ear disease, ototoxic drug use, and dominant genetic factors. Audiological test results were obtained for octave frequencies between 250 and 8,000 Hz, and distortion-product otoacoustic emission (DPOAE) and immittance studies were conducted.

Of the participants, 90 percent had a moderate to severe hearing loss in the low frequencies (less than 2,000 Hz) and severe to profound loss in high frequencies (4,000-8,000 Hz). At 8,000 Hz, 95 percent had profound hearing loss (81 dB or greater).

The average hearing loss between 250 and 4,000 Hz was 79.1 dB. Most patients had a mild conductive component.

These trends are consistent with the findings of a retrospective chart review including 38 female and 12 male nonagenarians with hearing loss living in South Orange County, CA.

Their ages ranged from 90 to 99, with a mean of 93. Participants were included in the review if they passed the same screening criteria reported in the Chinese study, and results from both studies were analyzed using equivalent statistical criteria.



This graph shows the average bilateral audiograms for patients in their 90s and for patients 100 and older. The frequency patterns are highly correlated (0.98), with a 19.7-dB average difference between the groups across octave frequencies (250-8,000 Hz).

In the California study, 95 percent of these nonagenarians had mild to severe low-frequency hearing loss (52.3 dB mean, 12.0 dB standard deviation [SD]) and moderate to profound high-frequency hearing loss (77.4 dB mean, 12.7 dB SD). Of the participants, 52 percent presented with a profound loss at 8,000 Hz.

The average hearing loss was 60.1 dB (9.1 dB SD), and 14 (28%) of patients had asymmetrical or mixed hearing loss. Average speech discrimination scores on the Northwestern University Auditory Test No. 6 (NU-6) were 73.2 percent (19.8% SD).

These studies did not address central presbycusis or hearing loss-related declines in cognitive abilities.

The challenge will be providing these patients with aural communication that supports their engagement with family, friends, and caregivers. Having treated these aged patients for many years, I find that training and abilities vary considerably and that special care must be taken to achieve the benefits improved hearing offer this growing population.

The April Hearing Matters column will cover the treatment of aged patients and the management of their hearing and communication issues, especially in relationship to central presbycusis.

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